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THE

PREFACE.

WE Live in an Age, happy for the Freedom that Men uſe upon Philoſophical Matter; Truth only is pretended to by every Party, no Mens Authority is valued at all: Truth is the beſt Maſter without Diſpute, but not an eaſie one to be met with; in the mean time, it deſerves well enough our Application: To this intent, being buſie to look into the Principle, which Philoſophers and Phyſicians propoſe, to be in uſe in the Practice of Phyſick, I have been unſatisfied, and many times aſhamed, to ſee ſo great and frequent Con-

tradictions among us. I did what I could all along, to reconcile Opinions.

The beſt way, methinks, to pretend to it, is to pitch upon Matter of Fact, and to advance gradually, from one Truth to another. In this Method the Structure of a Plant, being Examined by Ocular Inſpections, compared with the Structure of our own Body, and their Parity and Diſparity obſerved, might give the ſureſt Grounds towards truly knowing, and readily Curing Diſtempers.

I am, like other Phyſicians, in the Opinion, That Final Cauſes muſt be of ſome Conſideration; and, by the leave of the Modern Philoſophers, I will ſay, That Phyſicians, which

which ſpend the beſt part of their Lives in Inquiry, about the Structure of Man's Body, are the beſt Judges in this Matter: Such Knowledge brings Man to their duty, to be grateful to God, and to Worſhip Him; and this *Uſus Partium* is moſt neceſſary to Men which intend to dive into the moſt difficult Caſes, and Variety of Diſeaſes.

The uſe of the Arteries hath hitherto been thought to carry Food and Nouriſhment to the whole, which in theſe Treatiſes, I make bold to reject as erroneous: We intend to ſay ſomething about the Digeſtions in the Stomach, after the manner of a Machine, called *Digeſter*, the Ways of Secretion, the Falſhood of many Phyſi-

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cian's Hypotheſis, the danger to Practiſe Phyſick keeping cloſe to their direction; ſome good, and great many more bad Effects, of the pretended Univerſal Medicine.

I will enquire into the Nature of Fevers, and ſhew, that their Riſing is rather from the Error of a Change in the Solid Part of the Machine, than from the Alteration of the Blood, or other Juices. I proceed to clear, how the Jeſuit's Bark does the work, in the Cure of *Agues*, upon the propoſed Notion: Theſe, and other Diſcoveries of the like Nature, will, I hope, be Uſeful to promote, both the Theoretical, and Practical part of Phyſick.

I intend to Continue this Diſcourſe, as my Time will permit.

AN

AN ESSAY Concerning Nutrition *in* ANIMALS.

CHAP. I.

What may be the Mechaniſm in the Beginning, and in the Progreſs of a Lively and quick Nature, common both to Plants and to Animals; the Parity of their Organical Particles, towards the Diſcharge of ſome Functions.

WE commonly diſtinguiſh in Animals different Things: Firſt, They are of a lively and a quick Nature; they are both Nouriſhed, Growing, and able to produce Seeds, and thoſe things they have in common with

with Plants: The Principle, or the Power to perform the ſaid Actions, is call'd a Faculty.

In an Animal, beſides theſe three Faculties, we have a local Motion and Senſation, which ſuppoſe, ſome other kind of Faculty or Power: Furthermore, to have a Deliberation, and a Will to act, according to ſome Rules and Laws of Juſtice and Equity, ſettled for our own Safety, and for the Safety of others; it is a thing common neither to Plant, nor Animal, but it belongs to Man alone.

No doubt, theſe aforeſaid Faculties depend upon a certain Figure, certain Order, and certain Poſition of their Particles, which joined together with a Liquid, compoſe a ſingle Body, very fit for ſome intended Action, by the Inventer of it; and this is called a Mechaniſm, and Men are a kind of Machine at this rate.

According to this Notion, the Body of a Man, which is uſed to perform ſome of theſe Actions, common to Plants, and to the generality of Animals, hath probably ſome Organical Particles, and bigger Parts, very like the Particles and Part of theſe ſaid Creatures.

From the Likeneſs of them: If there is any, without any danger of Prevention, we may judge they are intended towards the Performance of a likelihood of Action: To go another way, and to determine at random, about the peculiar uſe of a great many Kinds of different Parts and Particles, joined together promiſcuouſly; but intended, in the mean time, for different occaſions; to pronounce, I ſay, of their peculiar Uſe, without a good Preſident; gives occaſion to Confuſion, Prejudice, and Miſtake; and one may attribute unto one part, an Office which belongs to another: The beſt way therefore to avoid any Error in this point, is, when we have a Mind to know, which of the Particles in an Animal, are the true Organ intended, for the Faculty of Nurture, of Growing, of Producing Seed.

For fear of Miſtake, let us lay aſide the more Compounded Mechanical Body at preſent: And Conſider, Firſt, the Structure of a Plant, which is a more Simple Mechanical Body; a very good Preſident in the Caſe.

There we are certain to find no Part nor Particle ſubſervient to the Faculty of Local Motion, or of Senſation; and conſequently,

no fear of a Miſtake; and having had a view of their Shape, Figure, Order, Poſition, Junction, together with their Juices, which things are ſufficient enough, (as Experience ſhews) to the performance of all the Actions of a Plant: As long as we ſhall find ſuch like Organical Particles, and Juices, in an Animal, I think there is no Reaſon to attribute their lively and quick Action to any other, whatſoever kind of Particles, Parts, or ſort of Juice and Liquid, but rather ſtick to theſe, which having been ſufficient in Plants, to the ſame Action, may be able to perform the ſame in an Animal.

We have to ſay beſide; to do otherwiſe, and to conſult at firſt the more Compounded Body, may bring us into a Miſtake, to attribute to one part, an Office which belongeth to another; this we may eaſily prove by a Tryal of it in *Anatomy*.

There every one looking *in Globo*, into the Compoſition of Man's Body, thinks ſure he does know enough of it's true Organical Parts intended to ſerve to the Welfare of its lively and quick Actions; becauſe he himſelf has ſeen an indefinite number of Veſſels, called Arteries, which having received into their own Cavity a full quantity of Juice, from the Food out of the

the Stomach, through Lacteal Veins, Thorachick Lacteal Veins, seems to be of no other use, than to carry what they have receiv'd, towards the smallest and most remotest Particles of our Body, to furnish them Nurture with it; but it may prove the thing to be otherwise.

The first Conjecture I had about it, was in the Year 1684. and I gave then to the Publick, in a French Letter, directed to the most ingenious Squire *Boyle*, Printed in *London*, this Notion of mine there in *P.* 36. *viz.* I say there that the Chyle was immediately carried into Womens Breast to produce Milk, without need to go into the Heart, and into the Arteries first, and that after the like manner, this same Chyle may be distributed into every one Particle of our Body to furnish them Nurture.

Now what I called then Chyle, I do reduce it since to a Juice of no Colour, whereas the Chyle is whitish; and this Juice of no Colour, is the Original of all the Liquid of our Body; of which we have more to say hereafter. In this said Letter, Directed to the said Squire *Robert Boyle*, I did use some Arguments to prove, That Blood was not the Fountain, from whence

the Particles of our Body received their Nurture and their Growth: To theſe Arguments I have yet ſeen no Anſwer.

If the Arguments are good, to prove what I did intend, Blood being excluded accordingly from the Office of Nurture, the Arteries, at the ſame time, muſt by all means, fall ſhort of their ſuppoſed Function, *viz.* To carry Blood every where, upon an Account of a Liquid, intended to be a Matter, deſigned for the Nurture of every Particle of our Body.

This ſeems to me the more probable, becauſe Plants which have the Benefit of Nurture, have none of their Organical Particles, after the Likeneſs of an Artery, or a Vein. Moreover, in Man's Body, a great many Parts want theſe Veſſels, and conſequently do not uſe them, to receive Nurture through their Cavity.

Now it remains that we enquire, which way then the Parts and Particles of our Body may receive their Food, when the Arteries are excluded: This Query does totally depend upon the Knowledge, one may Borrow from the Structure of Plants, and from the way of Diſtribution of their Nouriſhing Juice, all over their Body.

Towards this Structure we do receive, for

for granted, what we had out of thoſe Books Publiſhed a great many Years ago, by the Ingenious *Malpegius*, Dr. *Grew*, and the Abbot *Marriot*, three Eminent Men; who diligently applyed themſelves to look into Plants with a Magnifying Glaſs, and do agree together, That they have ſeen nothing elſe, in the Texture of Plants, but ſome Pores, ſome Fibres, ſome little Fiſtula's, ſome little Bladders, ſome ſhort and ſcanty Holes, like Store Houſes, without any Artery, or any Vein.

Upon Examination of a great many Parts of Man's Body, as Bones, Griſtles, Teeth, Nails, we find them to have ſome Organical Particle, like Plants, but nothing of Artery, or Vein.

The Structure then of Bones, of Griſtles, of Teeth, of Nails, being very like the Structure of a Plant, and both having alike, their Nurture, their Growth, without any Artery, we may conclude the ſaid Pores, Fibres, *&c.* to be, alone, the true Organical Particles of both theſe Mechanical Bodies, and conſequently Arteries are to be excuſed of this Function.

To come to the way of Diſtribution of the Nouriſhing Juice, it muſt be all alike in both of them: No doubt, Nouriſhing Juice

Juice may get into the hardeſt piece of Wood, into the Texture of a Rocky Bone, Tooth, &c. and this muſt be a way ſomething like Filtration; and if it is plain, as it is, that theſe hard Bodies receive their Food by ſuch ways, from Pore to Pore, from Fibre to Fibre, &c. Why ſhould we not think that it is a way common to a ſoft part of Fleſh, as well as to an hard Bone, or to a piece of Wood?

It ſeems to be ſo much the rather, becauſe the Rarity of the Texture of a ſoft part lies more open to the admiſſion of any Liquid; if then we do not ſee any Contradiction to it, it will be unreaſonable to ſuppoſe, that our Wiſe Maker would have multiplied a Being, without Neceſſity. The little Organical Particles, as we have ſaid, are alone ſufficient enough for the Work in a Plant, and in a great many parts of our Body, without the help of any Artery: And it would be againſt this ſaid Rule of Wiſdom, to join an Artery to other Organs, without any Neceſſity; and when the thing may be done as well without it.

Finally, we do not pretend, for all this, that the Arteries ſhould not have ſome Influence into the Functions of Nurture, and others: It may be like the Sun's promoting theſe

these Actions in raising up the Juice out of the Earth, and qualifying it, by the Vertue of its Beams; they both open the Passages, and procure a free Course to the Liquid, to go every where: Such like Office we may allow to the Arteries; which is a thing quite different from carrying into its Cavity the Food it self to be applied for Nurture to every part. And this is that which I oppose.

We do conclude then, (from the Parity of these said Organical Particles, from the likeness of the nourishing Juice, and from the Parity of the Actions, which we have proved in Plants and Animals, to be totally the same kind) that the presence of such like Causes must be attended with the same Effect, and that the same Effect is to be supposed to come from the same Cause, when so many Things, in all Circumstances, do agree so well together.

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CHAP. II.

What may be the Nature of the Faculty, or Power, which hath the greateſt Share in any Action; and what may be the Nature, of that which is called a Soul in a Plant, in Brutes, and in Mankind.

NO Body knows better, the Darkneſs, the narrow Limits, the Vanity of Learning, than thoſe who did apply themſelves to the attaining of it, and dived into the Myſtery of Nature. Ancient Philoſophers, ſurpriſed to a wonderful Admiration, about the Regular Motion of Heavenly Things, would have them to be Ruled by ſome Intelligent Being; at this Rate, every individual Creature below, having its different Degrees of Perfections, ſhould deſerve as well the Patronage, and the Preſence of an Intelligent Being, to aſſiſt at its admirable Actions, as things above ſhould pretend to.

No wonder then, if it has been thought on, that ſomething extraordinary, beſides the groſs Parts, and Juices of a Plant, and of an Animal, ſhould work out in them theſe

these Actions of Nurture, Growth, and producing Seed, and this hath been called the first kind of Soul in Plants; now to an Animal, which hath over and above a Plant, the Priviledge of Local Motion, and what is called Sensation, must be allowed another distinct Soul, to rule ov'r these different Actions; and this will be a second kind of Soul. It is a very hard Matter, to give a just definition of these pretended Beings, and we think convenient, to inquire, if such like Beings are in Nature, to be distinctly perceived from the Organical Particles or Parts, from their Position, Order, Figure, Juice, joined together in a Plant, or Animal.

To this end, we think fit to Consult what is nearest to them, *viz.* some more simple and less Compounded Machine, plainly known to Mankind. No doubt Man may say, he knows a Thing, when he is in a Capacity to compose it, to set it in a way to play the Work, he will have it to play; accordingly, a Watch-maker may be said to have a perfect Knowledge of a Machine we call a Watch, this piece of Workmanship hath its Organical Parts, made out of Metals; to bring things nearer related to Plants, and Animals. Let us suppose a Machine composed with the Metallical Particles, and Liquids, to have Share in these Actions. C An

An Ingenious Man got the Art to compose a Bird, which could walk alone, and pick up with its Bill any Seed, Corn, or Gravel, that is usual to this sort of Creature; the Natural and the Artificial both could Pick up Grains, let them go down their Throat, into their Belly; and from thence, let them out, after the manner of Excrements.

Such a Piece of Workmanship is easie to be known from Top to Bottom, and is very much Inferiour to the Mechanism of a Plant, or of an Animal; but nevertheless, it will look mighty strange and wonderful to an *American*, of no Experience: He would think with himself, that such Machine had in its Bowels some kind of Animals, which should Govern its rare Motions. Now, if a poor Mortal hath the Skill to work out such Machines, fit to perform these said Actions, in which we know of a certainty, that there is no other Power, Faculty or Soul, but the Management of so many pieces joined together, to work out of Necessity, such an effect, which we have foreseen, and do expect to come.

What can we say, about the Skill of our Great Master, the Omnipotent and Wise Maker of this World? Shall we reduce him,

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to the neceſſity of calling in, *viz.* (to work out the Function of any part of a Plant, or Animal;) any further Agent then their firſt Organical Particles, and their Juices, which Things he knew from Eternity, ſufficient to perform the work, as we did obſerve in workmanſhip: Doubtleſs it would be inglorious to his Infinite Wiſdom, to uſe unneceſſary means, to perform Actions, which can be done without them.

We muſt confeſs a great Diſparity between the Work of God and Man. Our Mechanical Piece, does borrow a great many things from its Prototype of God's Work; and ours is very far diſtant from its Perfections; for God's Work and Machine hath the Faculty to receive into its moſt intimate Parts, a repairing Nouriſhing Juice, and doth change it into its own Subſtance, to build out of it a new Structure, or at leaſt to enlarge it, in its Dimenſions, which we call Growth; and further, to produce out of its own Boſom, Seeds, and young ones of the ſame Nature.

This muſt be the Finger of God, and in ſome way a continual work of a Creation above the Strength of Humane Power: Let

all Mens Workmanſhip then, and Men together, bow before the Throne of the Almighty, to Worſhip and give him Glory. He is the true Original of all Power and Knowledge, the Light and the Living for ever. In reference to him, Men, and their beſt Works, are but Blind and Dead Idols: Shall we then pretend to go beyond him, to compoſe a Mechanical Body, able to perform its Actions, according to the Combination of its Particles, and other Things, which we have foreſeen, to be ſufficient to do the Work alone, without any other Agent; to pretend to out-do God himſelf in his Work, and to be Wiſer than He, which is the Eternal Wiſdom it ſelf? This would be againſt all Reaſon; for who can deny to allow him the ſame thing with us, who has not only power to make a Machine fit for all the Actions, our Artificial Machine is Capable of, but to raiſe it alſo beſides to theſe Perfections, (above our Artificial, of receiving Nurture, Growth, and producing Seed.)

Theſe things being well conſidered, we will lay aſide the thought of a Soul; and as no Body yet hath medled with it in Phyſick, *viz.* to get any Inſtruction from it, to redreſs what is miſſing and out of Order,

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in Animal, we must rank the Soul in Plants, and in Animals, amongst the Imaginary Beings, which are Productions not of Nature, but of Fancy only. It is no matter then, for Physicians to be busie about a thing of no use at all; all our Measures and Indications, by which we set into their former Order, any of these Mechanical Beings, will be in such one of their Organical Particles and Parts, Number, Position, Figure, Order, and the true qualification of their Juice, in fine to amend what may be wanting; this I say must be all the Care of a Physician, and the true Bounds of his Knowledge and acting.

What we have said against this imaginary Being, a Soul in the Mechanism of a Plant, and of an Animal in general, must not be extended further, then the Bodily Shape of a Man; which to the performance of these Actions, of Nuture, Growth, producing Seed, is a simple Machine without any Soul, like a Plant, or other Animal; and therefore, after the same manner in the Performance of Local Motion and Sensation, he wants, by no means, the help of a Soul.

But since in Mankind, there are some Extraordinary Actions, which are not common to other

other Animals, as an indefinite Knowledge of all sorts of means, to serve his Designs, whereas Brutes have their bounds and limits, every one in a small Compass: A Notion we have in the heart of Justice and Equity, the precision of Times, of what is Past, or present, and what is to Come; the large Instrument of Reason, to go from Step to Step, till we can discover Truth; to know the Causes by their Effects, and from the Effects to come back to their Causes; to know the Propriety, Relation, and degrees of Parity and Disparity in the Nature of Numbers and Measures; above all, to Confess and Worship our Omnipotent Maker, and to be sensible together of our own Weakness; to be in a Capacity to feel an internal Joy, distinct from what is produced in us, by external and Organical Sensations, to think, and to make Reflections with our selves.

All these Perfections, prove another sort of Power in Man, then what is common to Animals in general, Local Motions and Sensations; this Power or Faculty we call a Humane Soul, to discourse about whose Nature it is a very hard Task; the most Ingenious Philosophers of Old, have had but very dark Notions about it, they are the most part incertain and wavering in their Opinions, about this Matter; and I think the Attainment of it to be above our Human Reach: To this we have for Witness the Incapacity of our Fore-fathers, which aimed at it, and have done

done nothing at all; the Modern Authors of themſelves, have had I think as little Succeſs.

In my Opinion the true Cauſe of it is, we would heartily know a thing of our ſelves, which is beyond the bounds of Humane Capacity; for the firſt Man himſelf being made by the Power of his Omnipotent Maker; and adorned with the beſt Faculty for Diſcovery, ſuppoſe he ſhould have had a mind to enquire about the proceeding of his Production, a thouſand thoughts might have come into his mind, about different Cauſes he could point at; but they would have been altogether uncertain and wavering Opinions, having nothing of Reality in them; for in matter of Fact unparalel, as this is one, (how and which way the firſt Man was made) ſince he was not in Being, before he was framed, all his Care for a Diſcovery thereof would have been needleſs, the perception of a thing done, and the way of its doing, before his coming into this World, was a piece of work above his reach, he could not be a competent Judge of it, the only way to make him ſenſible of it, was the way of Narration: Accordingly, it pleaſed the Lord God to teach our firſt Parents, and to reveal to them, what we have out of the Book of *Geneſis*, that God formed Man of the Duſt of the Ground, and breathed into his Noſtrils the Breath of Life, and Man became a Living Soul: This Soul we have above and over what we mention'd before, *viz.* what Mechaniſm, the Plants and Animals, have in common with us; this Frame,

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alike theirs, God gave us out of the Duſt, and directed all our Organical Parts and Particles, with their Juices, to his Ends and Intention, without any other Agent diſtinct from them.

For beſides the reaſon we have given of Conveniency, which ſhows it would be below the Infinite Wiſdom, to give to his Machine an unneceſſary Soul; in ſhort to determine all the difficulty about it, God has not only revealed to Man his own Production, but gave him an account, how he proceeded in the making of Plants and Animals; there the diſtinction is plain; we have not a word of breathing into their Noſtrils the Breath of Life, a Living Soul; then we conclude well, that they have none, and that for certain we have one, becauſe it pleaſed God to inform us of it, this Faculty, or Power, hath ſomething in its being totally diſtinct from the Machine; and no wonder if the Ancient Philoſophers have had but a wavering Opinion about it, ſince they went a wrong way, to get a ſolid and real Knowledge of their manner of making; and this being a manner of Fact done, before we had any kind of perception, it is only to be known by way of revelation, which in this preſent caſe proves to be of an abſolute neceſſity; upon which only we rely for the exoluſion of any, being called a Soul in Plants and Animals, and for aſſerting a Living Soul in the Breaſt of Man.